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THE TRANSPORTATION PHASE OF THE OIL INDUSTRY

I

For more than a generation, the Standard Oil Company, in its relations with the various agencies of transportation, has faithfully illustrated the shipping practices and railroad economy of the day. Throughout this period, it has been the clearest medium through which to view prevalent shipping practices and current railroad economy. Paul de Rousiers, in his brief and scholarly treatment of the subject, remarked that the development of the Standard Oil Company or of some other dominant concern in the oil business, possessing its present characteristics, was inevitable on account of the railroad situation that prevailed throughout the first two decades of the oil business. Every other noteworthy writer dealing with the history of the company—even such writers as Hudson, and Lloyd, and more recently, Miss Tarbell—has conceded that the course of the company has been shaped entirely by its transportation conditions. To the student familiar with the railroad history of the period, the contract between the railroads and the South Improvement Company, in 1872; the equalizing rates promulgated in the “Rutter Circular” in 1874; the pools and the rate wars among the railroads between Chicago and the seaboard, and the pipe lines in the oil regions, between 1874 and 1877; the division of the traffic between the railroads, according to the agreements of 1877, 1881, and 1884; the

apportionment of the traffic between the pipe lines in 1882—all of these are simply the reflex of the railroad conditions of the time. They clearly mark the progress from the chaotic situation immediately following the Civil War until the time when discriminations and pooling were forbidden to the railroads by the Interstate Commerce Act of 1887.

Equally interesting is the development during the same period, of the transportation of oil by pipe lines. As early as 1874, a tendency toward the unification of control manifested itself in the reorganization of the United Pipe Lines which then controlled about 30 per cent. of the traffic in the Pennsylvania oil regions, by certain capitalists associated with the Standard Oil Company. Throughout the pooling arrangements, and rate wars that succeeded each other in rapid succession from 1874 until 1877, this Company grew until eventually it absorbed the Empire Transportation Company and the Columbia Conduit Company, and became for the moment dominant in the oil industry. In 1879, the project of the Tide Water Pipe Company to extend its pipe lines to the sea precipitated the same competition that occurred when the railroads from Chicago to the seaboard began to unite into systems. The National Transit Company was organized in 1881 by interests connected with the Standard Oil Company for the purpose of building a pipe line from the oil regions to the Atlantic Coast. In the keen competition for the oil traffic that followed, both the pipe lines and the railroads joined. In 1883 an agreement was finally reached to end the rate war, and to divide the traffic between the railroads and the pipe lines.

This persistent tendency of all transportation agencies to combine into extended systems is more strikingly illustrated in the history of the independent pipe-line companies. In 1887, the Producers' Protective Association was formed by the leading independent crude-oil producers of the country, for the purpose of accomplishing the "shut-down" in the production of oil during 1887 and 1888. As an outgrowth of this movement, the Producers' Oil Company, a limited partnership, was organized in 1891, which laid local connecting pipes in the newly developed

McDonald field, and disposed of the oil thus connected to independent refiners in western Pennsylvania. In 1892, a new limited partnership, the Producers' and Refiners' Oil Company was established by the same interests, and built a pipe line from the McDonald fields to Oil City and Titusville. During the same year, certain independent oil refiners organized the United States Pipe Line Company, and began the construction of pipe lines from Bradford, Oil City, and Titusville to Wilkesbarre, whence the oil was to be transported by rail to New York. In 1893, for the purpose of concentrating the control of this Company, all the stock was put into the hands of a single trustee, afterward succeeded by three trustees, who voted all the stock at all the meetings of the stockholders. As this Company had no power of eminent domain in the State of New Jersey, it experienced great difficulty in purchasing by private sale a right of way across the state to the seaboard, and eventually abandoned the attempt. In 1901, the company extended its lines southward to Marcus Hook near Philadelphia.

In order to promote a stronger union among these independent companies, the Pure Oil Company was organized, with a capital of one million dollars, by the same refiners who had organized the Producers' and Refiners' Oil Company, and the United States Pipe Line Company, for the purpose of marketing the oil by the refiners. In 1900 these refiners became convinced of the advisability of combining their various companies, and accordingly they increased the authorized stock of the Pure Oil Company from \$1,000,000 to \$10,000,000, and transferred to it a majority of the stock of the Producers' Oil Company, the Producers' and Refiners' Oil Company, and the United States Pipe Line Company. Since this noteworthy consolidation was affected, the Pure Oil Company has built, directly or through its subsidiary companies, additional pipe lines in Ohio and West Virginia, has begun the production of oil, and has built a refinery at Marcus Hook. Through the combination of these large pipe lines into one system, and the extension of the principle of combination so as to include all branches of the oil industry—the production of crude oil, and the refining

of petroleum, as well as the transportation of oil—the strength of the Pure Oil Company, as a formidable competitor of the Standard Oil Company, has been greatly increased.

From the considerations already outlined, Commissioner Garfield's conclusion, stated in the preliminary volume of the Report on the Petroleum Industry by the Department of Commerce and Labor, appears manifestly true, that in the study of the oil business, "the most important subject is transportation because the cost of transportation is a very large percentage of the total cost to the consumer of the finished product and hence a most important factor in competition."

While transportation is the controlling factor in the petroleum industry, it must be noted that the railroads are no longer the dominant agencies in oil traffic. Railroad conditions, as Paul de Rousiers stated, "though important in the beginning, went into the background with the absorption of the pipe lines, and though very helpful in the creation of the trust, were not indispensable to its continuance."

The importance of other branches of transportation has been noted by Commissioner Smith in the first volume of the Report on the Petroleum industry above mentioned:

The use of pipe lines has had a very important influence upon the location of the refineries and the method of conducting the petroleum business. . . . Tank steamers are used for water transportation and tank cars for rail. Moreover, both in this country and Europe, illuminating oil is largely delivered to retail dealers by means of tank wagons, and this same method is often used for delivering the product to the final consumer. At least in the United States, the tank-wagon delivery is also often employed for naphtha. The bulk system of transportation and delivery is much cheaper than the use of barrels or other packages, wherever the volume of business is large. Most of the towns of more than one or two thousand inhabitants in the United States have tank-wagon delivery of illuminating oil. This system of marketing, as more fully shown in the present report, has an exceedingly important bearing on the control of the industry and on prices.

The problems presented in the transportation of petroleum by rail are those which remain after a generation during which legislatures and courts generally have undertaken the regulation of railroad business. The problems presented in the pipe-

line situation are those naturally arising in a business possessing some, but not all, of the attributes of a common carrier, in which the rights and duties of the companies and their customers have not yet been clearly determined. The problems presented in the use of tank steamers, tank cars, and tank wagons, discussed for the first time by Commissioner Garfield and Commissioner Smith in their recent Report on the Petroleum Industry, are, in large measure, unique, and open up a field of speculation involving the fundamental principles of business competition.

II

The intricacy of the charges which Commissioner Garfield makes regarding transportation of oil by rail, is gratifying proof of the degree to which the refinement and the solution of the problem of regulating the railroads has been carried. After an inquiry into the oil traffic upon all the principal railroads in the United States for the past three or four years, and in some cases extending back about fifteen years, the commissioner states that

with one or two exceptions the investigations of the bureau have as yet discovered no rebate in this technical sense in interstate business, although on shipments wholly within the state of California, the Standard and also several other large concerns have received direct rebates of considerable amount.

The commissioner adds, however, that rebates are not expressly forbidden by law in California.

Except, therefore, within states like California, where rebates are not unlawful and where all shippers receive them, the practice of direct rebating, which led to the enactment of the Interstate Commerce Act of 1887, has apparently disappeared from the oil industry. The charges of the commissioner regarding the present situation of railroad transportation involve highly technical matters and may be summarized as accusing the Standard Oil Company of obtaining discriminations in the open arrangement of rates, in the classification of rates, in the rules of shipment, in the treatment of private tank cars, and in secret and semi-secret rates.

In discussing the open arrangement of rates as regards the shipping-points of the Standard Oil Company and those of independent refiners, the commissioner concedes that in some measure the shipping-points of the Standard Oil Company deserve better rates than those of their competitors:

The great advantages that the Standard Oil Company enjoys over its competitors with respect to transportation are undoubtedly in part the direct outgrowth of the enormous scale on which it conducts its business and of the favorable location of its refineries. They are in some degree, at least, natural advantages. Disregarding the question of the origin of the power of the Standard Oil Company, and considering only its present position, the advantages which it possesses with respect to transportation are certainly in part independent of any present discriminations from railroad companies.

This fact is demonstrated by the location of the refineries of the Standard Oil Company, as regards the centers of crude-oil production and the markets for the product. The leading oil fields from which the country is supplied with refined petroleum are the Appalachian, the Lima-Indiana, and the Mid-Continent fields. The Appalachian field extends from western New York to western Pennsylvania, into eastern Ohio, western West Virginia, Kentucky, and Tennessee. The Lima-Indiana Field lies in northwestern Ohio, and central eastern Indiana. The Mid-Continent field is in southeastern Kansas, and the northern part of Oklahoma and Indian Territory. The leading refineries of the Standard Oil Company are located at a distance from these oil fields, and close to the centers of consumption. The company refines two-thirds of its oil on the Atlantic seaboard in its refineries at New York Harbor, Bayonne, New Jersey, Philadelphia, and Baltimore. A smaller group of its refineries is situated close to the Appalachian Oil Fields, at Parkersburg, West Virginia; Pittsburg and Franklin, Pennsylvania; and Olean and Buffalo, New York. With these refineries must be classed also the refineries of the company at Lima, Ohio, and at Cleveland. At Whiting, Indiana, within the switching limits of Chicago, and close to the great markets of the Middle West, is a large refinery which consumes more crude oil than all of the refineries of the Standard Oil Company in the Appalachian and Lima fields combined. At Sugar Creek, Missouri, near the

great markets of the south and southwest, and 150 miles distant from the oil fields is another large refinery of the company. In the northern part of the Mid-Continent field, is a smaller refinery of the company. In contrast with the refineries of the Standard Oil Company, most of the independent refineries are located in or near the oil fields. There are four independent refineries on the Atlantic seaboard. The great centers of independent refining, however, are in western and northwestern Pennsylvania, and in Toledo and Findlay, Ohio. The large refineries of the Gulf Refining Company and of the Texas Company are located in southeastern Texas, and distribute their oil in the southwest by rail, and to a slight extent along the Atlantic Coast by tank vessel.

The advantageous position of the refineries of the Standard Oil Company, as regards the sale of their product, is obvious. One-fifth of the total domestic deliveries of refined oil by the Standard Oil Company are shipped from the seaboard refineries by tank vessels to points along the entire coast, whence they are carried inland short distances by rail. The Whiting refinery, until within a few years, has shipped over a large part of the United States west of Ohio about a third of the oil refined by the Standard Oil Company. Since the refining of oil is concentrated at a few points near the great markets, and the quantity of shipments, originated at these points, exceeds those originating in the oil regions, the natural effect, from the point of view of the railroads, is to remove the centers of oil traffic from the oil regions to the localities where the Standard Oil Company has established its refineries. As fast as these localities have taken on the character of natural "basing points" of the oil traffic, the fact has been reflected to a greater or less degree in the arrangements of freight rates from these localities.

The arrangement of freight rates by the New England railroads, of which the commissioner complains, is an illustration of this tendency. Water transportation has in large measure supplanted rail transportation in shipments in New England, both by the Standard Oil Company, and by the independent refiners. The points at which deliveries are made from

the tank vessels, and thence trans-shipped inland to the consumers, are scattered up and down the coast and have become the natural gateways of the oil traffic into New England. Accordingly, favorable freight rates from these points have been made to those independent shippers who make deliveries at these points, and similar rates can be made from the points at which the Standard Oil Company makes deliveries. In consequence, refiners located in the oil region, who have shipped oil entirely by rail in New England, have experienced the natural disadvantage of greater expense in transportation, and of reluctance on the part of the railroads to favor a comparatively small portion of the oil traffic to the detriment of a much greater traffic, which they obtain from other shipping-points.

Whiting, Indiana, situated within the switching limits of Chicago, is the site of one of the largest refineries of the Standard Oil Company, producing nearly one-third of the oil sold by the company in the United States. Whiting is, therefore, one of the natural centers of the oil business, and from the railroad point of view, exceeds in importance any of the shipping-points in the oil regions. Chicago is the railroad center of the Middle West, and for years has enjoyed the legitimate advantage of low rates resulting from this fact. These rates have been made applicable from all points within the switching limits of Chicago to all destinations into the south and southwest.

A typical arrangement of rates from Chicago is seen in the tariffs of the Chicago and St. Louis Traffic Association. This association was formed sometime prior to 1889, and comprises all roads running between Chicago and East St. Louis, Illinois. According to the tariff filed by the association with the Interstate Commerce Commission, the staple articles of shipment were divided into ten different classifications with grades ranging from 44 cents for articles in the first class, to 9½ cents for articles in the tenth class. Upon these rates the commissioner comments as follows:

Every railroad company is permitted to make exceptions to these classifications. . . . The rates that they apply upon such excepted articles, are referred to as commodity rates. . . . The purpose of the railroad in

making a commodity rate is to get traffic which it might not otherwise get at all. So long as there is any profit whatever in the business, a commodity rate may be reduced, if necessary to meet marketing conditions. The tendency of commodity rates is to put different producing points on an equality in reaching a given market, or more nearly on an equality than they would be on the basis of the relations established by class rates. Within reasonable limits, the principle of commodity rates is beyond question justifiable.

Consistently with this policy, the Chicago and St. Louis Traffic Association made numerous exceptions to the class rates, fixing commodity rates for excepted articles, and, according to the statement of its chairman, served notice of these commodity rates upon the Interstate Commerce Commission. Sugar and syrup, for example, which were in the sixth class, at a class rate of 17 cents, were given a commodity rate of 8 cents; starch, which was in the sixth class, was also given a commodity rate of 8 cents; cotton-seed and linseed oil, which are more valuable than petroleum, were in the fifth class at a class rate of 18 cents, but were excepted therefrom and given a commodity rate of 8 cents; lard oil, which was in the fifth class at a class rate of 18 cents, was given a commodity rate of 6 cents; similarly, petroleum and its products, which were also in the fifth class at a class rate of 18 cents, were excepted therefrom and given a commodity rate of 6 cents. Pursuant to the rule of the Interstate Commerce Commission that "wherever articles are placed under both the class and commodity rates, the commodity rates shall govern, and the goods shall be paid for at the rate," these commodity rates were regularly applied to all shipments from all points within the switching limits of Chicago to East St. Louis, whence connections were made with roads reaching southern and southwestern destinations.

The importance of Chicago as a shipping-point is further recognized in the practice of all the railroads west of Chicago, which fix their rates from Chicago as the "basing point," instead of "pro-rating" with eastern roads, in charges upon oil shipped from the oil region. If the western roads should pro-rate with the eastern roads, they would receive only the proportionate part of a through rate from the eastern shipping-point to the

western destination. They would thus lose the full local rate from Chicago to western points, which they now receive.

The theory of the western lines in taking this action [explains the Commissioner], was doubtless that they would thereby increase their revenues: that instead of having to accept a proportion of a through rate from the East, which would be less than their local rate from Chicago, they could get practically as much traffic wholly over their own lines from the Whiting refinery. Knowing the enormous size of the Whiting plant, they presumably thought that it would be able to supply the entire western territory, so that there would be comparatively little occasion for shipment of oil from the East.

A similar advantage accrues to Chicago and adjacent shipping-points from their geographical location. Chicago is nearer to the Ohio River cities, which serve as gateways to the southern market, than are the refining-centers in the oil regions. Chicago is almost equally distant from Cincinnati, Louisville, and Evansville, through which passes most of the southbound traffic originating north of the Ohio River. Toledo, Cleveland, and Pittsburg, the refining-centers in the oil region, are considerably farther from Louisville than from Cincinnati, and are still farther removed from Evansville. By concentrating their shipments at the nearest point equally distant from the Ohio River crossings, and shipping over these routes a volume of freight greatly exceeding that originated at Cleveland, Toledo, and Pittsburg, Chicago shippers have been accommodated with an arrangement of through rates to southern destinations beyond the Ohio River. The railroads serving Toledo, Cleveland, and Pittsburg belong in general to different systems from those which have joined in this arrangement of rates at Chicago. The southern shipments which are offered them are less in amount and are scattered over a considerable area instead of being concentrated at one point. Consequently, these roads are unwilling to forego the full local rate to the Ohio River which they now receive, and to join in "pro-rating" arrangements with southern roads, according to which they would receive only a proportionate part of a low through rate.

The questions raised by the commissioner regarding the arrangement of freight rates from Whiting relate chiefly to the

propriety of applying to Whiting and to other points within the switching limits of Chicago, tariffs referring to Chicago; and also to the legality of the mode by which these tariffs are said to have been filed with the Interstate Commerce Commission. Since these questions are at present subjects of litigation in the courts, the discussion of them may best be postponed for the present. The larger questions, regarding the reasonableness of these arrangements, involve considerations which have here been merely outlined, and which must be explored and measured more carefully than the commissioner has attempted in his report, before a safe conclusion can be reached.

The classification of petroleum and its products, the rules of shipment, and the treatment of private tank cars by the railroads, are discussed by the commissioner. Oil in carload lots can, obviously, be carried cheaper than oil in less than carload lots. Oil in tank cars can clearly be carried cheaper than oil in barrels, or drums or boxes, upon which freight must be charged for both the contents and the container. These facts are so apparent that at present the independent refiners make as large use, relatively, of bulk shipments and of tank cars as the Standard Oil Company. Referring to the use of tank cars the commissioner says:

The complaint was also advanced at an earlier time that the Standard Oil Company was favored by reason of excessive payment by the railroads for the use of its tank cars. So far as the Bureau has been able to ascertain there is not at present any basis for this charge, if there ever was.

In California it is complained that the Southern Pacific Railroad, which carries on its road a large proportion of the railroad traffic in oil, has shown great favoritism in supplying to one of its subsidiary companies, the Associated Oil Company, a large quantity of tank cars and refusing to allot cars to other shippers. Another complaint reported by the commissioner, is regarding rates fixed by the railroads in computing freight charges on shipments of Kansas crude oil and its products. The long-established practice of the railroads in older oil fields, namely, that of assuming for the purpose of computing freight charges that the weight of crude oil and all its products is 6.4

pounds per gallon, presents no cause for criticism. The Kansas crude oil, however, is much heavier than that of the older oil fields, and on an average weighs about 7.2 pounds per gallon. The railroads have, therefore, raised the arbitrary weight of Kansas crude oil against the protest of the Standard Oil Company and the independent interests to 7.4 pounds, and have continued the arbitrary weight of petroleum products at 6.4 pounds. Fuel oil, which is one of the products of petroleum largely carried by the railroads, weighs slightly more than crude oil, but is carried at the arbitrary weight of petroleum products. "These matters are highly technical" says the commissioner, "and it is impracticable to discuss them in this summary." The noteworthy feature in this branch of the commissioner's inquiry is the absence of a clear and well-defined instance of any unreasonable discrimination.

The refinements involved in the present problems of railroad rates are strikingly shown in the situation which receives the severest censure of the commissioner. The secret and semi-secret rates upon oil shipments, which he declares have from time to time been promulgated, consist in rates applying between points lying within the same State, which are not required by law to be published, and rates between points lying in different States, which have usually been filed pursuant to the requirements of the Interstate Commerce Act, but are alleged to be not sufficiently known to shippers generally. No proof exists, so far as appears from the report, that different rates are charged to different shippers between the same points. The mischief which the commissioner deplors is that "this secrecy leaves the independent refiner in the dark as to the most important factor affecting competition in common markets." As has already been noted, in connection with the railroad tariffs at Whiting, the legality of these rates is now being tested in the courts. Whether there has actually been any violation of law, or whether the Standard Oil Company—which according to the commissioner "maintains a large and highly paid force of traffic experts whose business it is to examine and become familiar with every possible combination of rates"—has simply

taken the rates as they were promulgated, is a question which must be determined, by the higher courts. Primarily, as the commissioner confesses, the fault is

in the Interstate Commerce law, viz., the method of filing and publishing tariffs. Although a tariff or a rate has been filed with the commission in compliance with the terms of the law, none but the favored shipper may know of its existence. Tariffs may be made and rates may be combined in such manner as to make it practically impossible for the ordinary shipper to find them. As long as the State rates are not required to be made public, and shippers use such rates in combination with interstate rates, all manner of devices to evade the purpose of the law are possible. All state rates used in connection with interstate shipments should be filed with the Interstate Commerce Commission, and a radical change should be made in the direction of simplifying tariffs and in methods of posting and filing them.

From the time when freight charges collected from the shipper were repaid in part as rebates until the present day, when rates filed according to law are sometimes deemed improper because knowledge of them is not completely brought home to shippers who ship over other routes, tremendous progress has been made in regulation of railroad rates. Without minimizing the gravity of existing problems in the railroad rate situation, the celerity with which the formidable problems of the past have been solved, is convincing proof that the questions raised by the commissioner will be decisively answered in one way or another, at no distant date.

III

Pipe-line transportation is carried on under conditions differing widely from railroad transportation. The capacity of a pipe line is strictly limited by the gauge of the pipe. It cannot be increased, like that of a railroad, by the relatively small expense of additional rolling stock, but can be increased only by a duplication of the pipes. To aggravate this difficulty the production of oil in the oil fields is exceedingly variable. In Colorado, for example, the production of oil fell from 501,763 barrels in 1904 to 376,238 barrels in 1905; while during the same period the production in Louisiana and Texas rose from 25,200,371 to 37,046,605 barrels, and the production in Kansas and Indian Territory rose from 5,617,527 barrels to 12,013,-

495 barrels. The Appalachian and Lima-Indiana oil fields, which in 1900 produced 91 per cent. of the crude oil of the United States, produced in 1905 only 38 per cent.; while the proportion of production during the same period in the Gulf States rose from 1 per cent. to 37 per cent., and in California rose from 6 per cent. to 24 per cent. Commissioner Smith writes:

The production of oil pools and fields frequently falls off greatly after a short time so that adequate pipe lines built to meet the temporary emergency will soon become superfluous. For the same reason pipe lines cannot properly be required to build storage tanks to hold a temporary superfluity of oil.

Nevertheless the pipe lines have generally accepted the risk incident to this extreme variation in production. While the companies are compelled to abandon, in the older exhausted fields, large investments in pipe lines and storage tanks to which shipments of oil are no longer offered, they have energetically reached out with new gathering lines into newly developed territory. Miss Tarbell in her *History of the Standard Oil Company* describes this rapid investment in tanks and pipes:

One of the greatest construction feats the country has ever seen was put through in the years 1878, 1879, and 1880, in the Bradford oil fields by the Standard interests. It was a wonderful illustration of the surpassing intelligence, energy, and courage with which the Standard Oil Company attacks its problems. . . . The contract which the Standard signed with the producers in February, 1880, pledged them to take care of a production of 65,000 barrels a day. When they signed this agreement there was above ground nearly nine and one-half million barrels of oil. The production increased at a frightful rate for four years. At the end of 1880 there were stocks of over 17,000,000 barrels above ground; in 1881, over 25,000,000; 1882, over 34,000,000; 1883, over 35,000,000, and 1884, over 36,000,000, and the United Pipe Lines took care of this production with the aid of the producers, who built tanks neck and neck with them. In 1880 the Standard people averaged over one iron tank a day, the tanks holding from 25,000 to 35,000 barrels. There were not tank builders enough in the United States to do the work, and crews brought from Canada and England. This, of course, called for an enormous expenditure of money, for tanks cost from \$7,000 to \$10,000 apiece. Rich as the United Pipes Lines were they were forced to borrow money in these years of excessive production, for they had to lay lines as well as build tanks. There were nearly 4,000 miles of pipe line laid in the Bradford region along from 1878 to 1884, and these lines

connected with upward of 20,000 wells. . . . In 1891 a great deposit of oil was tapped in the McDonald field of southwestern Pennsylvania. The monthly production increased from 50,000 barrels in June to 1,600,000 in December. It is an actual fact that in the McDonald field the United Pipe Lines increased the daily capacity of 3,500 barrels, which they had at the beginning of July to one of 26,000 barrels by the first of September, and by the first of December, they could handle 90,000 barrels a day. If one considers what this means, one sees that it compares favorably with the great ordinance and mobilizing feats of the Civil War. To accomplish it, rolling mills and boiler shops in various cities worked night and day to turn out the pipe, the pumps, the engines, and the boilers which were needed. Transportation had to be arranged, crews of men obtained, a wild country prepared, saw-mills to cut the quantities of timber needed built, and this vast amount of material placed and set to work.

Pipe-line charges, like railroad rates, have generally been fixed at the rate which will move the traffic, rather than at the actual cost of operation over the distance covered. By reason of the risks entailed by the extreme variations in oil production, and the necessity for exceedingly large investments in sudden exigencies, it is usual that charges for the service of new gathering lines should be fixed at less than cost of operation. Charges for use of the trunk lines must be correspondingly greater than cost of operation in order to avoid a deficit on the entire system. The commissioner's statement that the pipe lines enforce an unreasonable rate of charges, rests upon the assumption that "a reasonable pipe-line rate is one which covers the cost of operation and depreciation and leaves a fair return for interest on the investment and for risk." This basis has hitherto never been applied in determining transportation charges of any kind. Furthermore, what constitutes a "fair return"? The risk of the investment is a very considerable item in the pipe-line business, and has not been estimated by the commissioner. Finally, imposition upon the pipe-line business of a rule of governmental regulation appears most questionable in view of the fact that the pipe-line business is, in large measure, that of a private rather than of a common carrier.

The Prairie Oil and Gas Company, a subsidiary pipe-line company of the Standard Oil Company, according to the commissioner, "has not acted as a common carrier and has given no

indication to the public that it will do so." A similar policy is declared to have been pursued by the Ohio Oil Company, and the Tide Water Pipe Company, both of which are said to be affiliated with the Standard Oil Company, and by the Producers' and Refiners' Oil Company, an independent pipe line affiliated with the Pure Oil Company. Although the law of West Virginia, New York, Kansas, Pennsylvania, and the Federal Government provides that pipe lines may, for some purposes, be treated as common carriers, this rule is probably applicable only to pipe-line companies which have exercised the right of eminent domain in acquiring their right-of-way, or have openly held themselves out as carriers of oil for the public generally. Upon these points the commissioner gives no information, and the application of the law of common carriers to these pipe lines is, accordingly, far from clear.

The charges which the commissioner makes against the pipe-line companies are that they refuse to transport oil for others, or to deliver at desired points, or to sell crude oil, or to enforce reasonable regulations as to the quantity of shipment. These charges, like the complaint which the commissioner makes regarding the rate of pipe-line charges, rest upon the assumption—which is not proved in his report—that the pipe lines are common carriers. At the outset, therefore, the commissioner's conclusion must be questioned. Examined in detail, however, the practices, of which the commissioner complains, appear to be natural to all private businesses, and to be wrong only in the case of recognized public-service companies. Thus, instances are cited in which pipe-line companies, both of the Standard Oil Company and of independent refiners, refused to carry oil in the quantities desired by a shipper, or to make deliveries at points where the pipe lines had no connections or delivery pipes. Since the pipe-line companies do not own the oil which they carry, but at most are merely affiliated through the common ownership of stock, with the companies owning the oil in their pipes, the commissioner's charge that the pipe lines of the Standard Oil Company have refused to sell oil, rests upon a misapprehension. The pipe lines, obviously, cannot sell

what they do not own, and since the company which owns the oil is, admittedly, engaged in private business, no duty rests upon it to sell oil to anyone who asks for it. The only charge entitled to weight is the complaint that certain pipe lines, which profess to act as common carriers, have enforced unreasonable regulations regarding the quantity of oil that must be presented at any one time for shipment. In view of the variation in quality between oils gathered in different fields, or even in different pools in the same field, some regulation is clearly necessary to prevent loss from mixture during transit through the pipes. Whether the present regulations have fixed the minimum of shipment at a reasonable large amount, is questioned by the commissioner.

The pipe-line situation, as a whole, presents surprisingly few problems. The pipe-line business, which possesses certain attributes of a public-service company, in other respects is, with few exceptions, conducted like a private business. As soon as the nature of the business has been determined by the courts, the grounds of the charges brought by the commissioner against the pipe-line companies will quickly disappear.

The importance of pipe lines in the economy of the Standard Oil Company cannot well be overestimated. According to the commissioner, the company's public and private pipe lines now aggregate about 35,000 miles, and cost about \$50,000,000. The magnitude of the enterprise is described by the commissioner as follows:

The lines of the Standard in the Appalachian, Lima-Indiana, Illinois, and Mid-Continent fields may be regarded as constituting, in a sense, a single vast system extending from the Indian Territory to the Atlantic seaboard, though the lines in and from each field form a distinct group or system. The oldest of these, the Appalachian system, covers the entire Appalachian field with a network of gathering lines, and also comprises five large trunk lines (including that of the affiliated Tide Water Company), of from one to three pipes each, running to tidewater, with terminals at New York Harbor, Philadelphia, and Baltimore, where large Standard refineries are respectively located, and at Marcus Hook, from which point the Standard exports crude oil in large quantities. The "Buckeye-Indiana" system covers the Lima-Indiana oil field, whence a trunk line (two pipes) extends westward to the Standard's great refinery at Whiting, Indiana, just

outside of Chicago; and another (three pipes) eastward to Bear Creek, Pennsylvania, where a large part of the crude collected is turned over to the Appalachian trunk lines for transportation to the seaboard. The Buckeye-Indiana system also supplies the Standard's smaller plants at Lima and Cleveland, and one independent refinery in Ohio. A trunk line connecting with this system has recently been built by the Ohio Oil Company, another Standard concern, from the new and important oil field of eastern Illinois. Another recently constructed system of the Standard is that serving the Mid-Continent field, and operated by the Prairie Oil and Gas Company. This system, after gathering oil from southern Kansas, Oklahoma, and Indian Territory, transports part of it to Griffith, Indiana, just south of Whiting, where connection is made with the Buckeye-Indiana lines, and through them, in connection with the eastern lines, to the seaboard. The Mid-Continent system at the same time supplies the refineries of the Standard at Neodesha, Kansas, and Sugar Creek, Missouri. Through this immense pipe-line system oil is actually piped the full distance from Indian Territory to the Atlantic Ocean. The lines are so connected that any refinery of the Standard from Kansas to the seaboard can be supplied, if desired, with oil of any one of these four great fields.

The tremendous natural advantage which the Standard Oil Company enjoys in the strategic location of its refineries and the vast system of pipe lines connecting them with the oil fields, has already been shown. The ingenuity with which the Standard Oil Company has enhanced its advantage by devising methods of refining inferior oils, produced at a distance, is acknowledged by the commissioner.

The production of the Lima field rose from practically nothing, in 1885, to 4,650,375 barrels in 1887, and 12,188,024 barrels in 1889, and continued rapidly to increase up to the year 1896. The Standard was the only concern that was in a position rapidly to lay pipe lines in the new field and provide tankage for the large production of oil. The Lima crude required special methods of refining. The smaller independent refineries using Pennsylvania crude could not make use of the Lima crude in their plants as they then were, and they were much less able than the Standard Oil Company to conduct experiments on a large scale with a view to devising methods specially adapted to the new oil. The Standard Oil Company was, therefore, for several years practically the only buyer of Lima crude.

Improvements in transportation have thus been the occasion of still more striking improvements in the mechanical processes of the refining business.

Most of the illuminating oil sold in the United States is

marketed by means of tank vessels, tank cars, tank stations, and tank wagons, which deliver the oil to the retail dealer in bulk without the use of barrels, or other packages, and without the intervention of jobbing concerns. The oil is loaded at the refineries into tank vessels or tank cars by means of pipes, which carry the oil by gravity or under pump pressure. The capacity of the tank cars varies from 80 to 300 barrels. Oil is delivered from tank vessels and tank cars to the various tank stations scattered along the coast and throughout the country, and there run by gravity, or pumped into storage tanks. In the more densely populated parts of the United States these storage tanks are located at distances of about 15 miles from one another. The most common method of delivering oil from the tank station to the retail dealer, or the consumer, is by tank wagons holding from 5 to 10 barrels, from which delivery is made through short pipes or by large buckets or measures. These tank wagons frequently make deliveries to customers at a distance of 5, 10, or even 20 miles from the tank stations, according to the density of population. This system of delivery is most conspicuous in the North Atlantic States and in the North Central States. In these States the proportion of deliveries by tank wagon, as compared with barrel deliveries, is estimated by the commissioner at about 80 per cent. The importance of this mode of delivery is emphasized by the Commissioner:

The Standard Oil Company makes relatively greater use of tank wagons than independents do, and, as the system is usually cheaper and always more convenient than package delivery, this fact gives the Standard an advantage in competition. Of the towns in which deliveries of oil by tank wagon were reported, such deliveries were made by the Standard Oil Company or some affiliated concern in 97.7 per cent. (2,993 out of 3,064), and in 92.6 per cent. (2,836) of towns of this class the Standard was the only concern for which tank-wagon deliveries were reported. Deliveries by tank wagons for known independent concerns, on the other hand, were reported in only 5.6 per cent. of the towns having this form of delivery, and deliveries by tank wagon by independents were the only deliveries reported in but 1.5 per cent. of tank-wagon towns. Standard concerns delivered oil by tank wagons in 81 per cent. of the towns in which their deliveries in any form were reported, whereas independent concerns were reported as using such delivery in only 38.6 per cent. of the towns in which their deliveries were reported.

Standard concerns were reported as delivering oil in barrels in only 25.3 per cent. of the towns in which purchases from them were reported; whereas independent concerns were reported as using barrel deliveries in 63.7 per cent. of the towns in which their sales were reported.

The reported equipment of the Waters Pierce Oil Company, which sells oil throughout the southwest, illustrates the development of the bulk system of delivery. This company had, at the end of 1905, 408 tank stations, at which were a total of 1,001 tanks having an aggregate capacity of 260,000 barrels. At 144 tank stations a total of 245 tank wagons are operated, varying from 300 to 550 gallons in country towns to 1,000 gallons in large cities. Each wagon ordinarily carries two kinds of oil and one of gasoline. The company manufactures its own iron barrels and drums, and had in use, in 1905, 28,192 barrels and 11,977 drums. The tank-wagon drivers act as solicitors of trade, but in addition, the company employs from 80 to 100 salesmen to visit the dealers every 30 or 40 days.

The advantage in distributing oil in bulk is considerable. The Commissioner observes:

It is often though not always cheaper and it is cleaner, safer, and more convenient for the retail dealers. In the first place the cost of railway and water transportation of oil in bulk is less than in barrels or other packages. . . . There is often also superior economy in the bulk method for the local delivery of oil from the railway to the retail dealer. The advantage of the bulk system here, however, is one not merely of direct expense, but even more of convenience and safety. It is a case of the superiority of a specialized method adapted to the peculiarities of the business, over an unspecialized method, used alike, for many kinds of business. Retail dealers usually very much prefer to handle oil in tanks filled from tank wagons rather than in barrels, which are likely to leak and cause dirt, bad odors, and risk of fire. The result of these conditions is that concerns which sell oil only in barrels are usually very ineffective as competitors of the Standard Oil Company.

The Commissioner complains that these conditions of marketing which prevail in the oil industry, tend to produce monopoly in so far as they permit the larger concerns to sell at lower prices in competitive localities and thus secure the trade of its competitors. Doubtless the larger concern enjoys this power. This mode of competition, however, is the most ordinary phe-

nomenon of business life. Every manufacturer reaching out for a new and distant market offers his goods at a price proportionately less than he charges in the nearer market, where he has already overcome competition. To combat competition with prices so low as to drive every rival from the field is one of the oldest and hitherto one of the most legitimate weapons of competition. This feature of the situation, however, is not the chief factor in the success of the marketing methods of the Standard Oil Company. The secret of the company's success in the local distribution of its product consists, according to the Commissioner, in its promptness in satisfying the need of the community. He explains it as follows:

Tank-wagon delivery is essentially a system of local transportation. As with other forms of transportation unnecessary duplication of equipment and service greatly increases the cost per unit of the product handled. One tank wagon can serve a given town or section of a city, which it is able to cover completely, quite as well as two or more, and at much less expense per unit. . . . The result of this characteristic of the business is that when a single concern has established facilities for delivering oil within a given town, other concerns hesitate to enter the field. They know that if they do so fierce competition is likely to ensue, in which the concern first established will have a considerable advantage. They know that, as in the case of other transportation enterprises, each competitor will probably try to increase his share of business by reducing prices, because he knows that the larger the amount of business which he can do the less will be the expense per unit.

By reason of being the first to incur the expense of equipping its extensive system of bulk delivery and of being the earliest to reach the market, the Standard Oil Company enjoys the natural advantage which always accrues to the first transportation agency in the field.

The problems presented to the commissioner's mind in the marketing situation in the oil industry are no different in substance from those apparent in every large business in the country. If, as the commissioner suggests, the situation requires governmental regulation, such regulation must limit the competition of the greater number of manufacturers and wholesale dealers throughout the United States.

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